R410A

AVH-12V1D
AVH-24V1D

DC Inverter Heat pump unit

User's manual

Before operation this product,please read the instructions carefully and save this manual for future.

Thank you for choosing our quality product.
Please read this manual carefully before use and follow the instructions to operate the unit in order to prevent damages on the device or injuries to staff.

Specifications are subject to change with product improvements without prior notice. Please refer to the specification sticker on the unit for upgraded specifications.

Working and storage temperature range

Working temperature range: -25℃~55℃
Storage temperature range: -30℃~60℃
Power supply: 220V/50Hz/1Ph

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1.1 Safety precautions

Special Notice

When the unit is not running in the winter, it is necessary to leave the power supply connected for Anti-freezing protection.

In cold weather (below 0℃), when the unit is no longer needed, do drain out all the water inside the system (refers to page 47).

■ Accessories

On receiving the equipment, please check whether the following accessories are inside the package.

AVH-12V1D/AVH-24 Accessories List

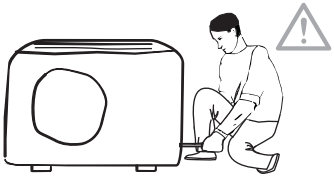
Name	Quantity	Remarks
User' s manual	1 piece	Installation & Operation Manual
Extra sensor kit	9 M	For detecting the room temperature
Locating Cardboard	1 piece	For locating the installation position
Rubber gasket	4 pieces	For anti-vibration purpose
Filter	1 piece	Keep the water clean

■ Safety precautions

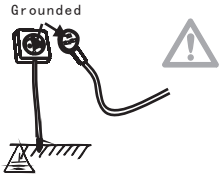
symbols used

Warning ---------- Suggestion

Prohibition



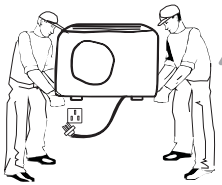
The installation, dismantlement and maintenance of the unit must be performed by qualified personnel. It is forbidden to do any changes to the structure of the unit. Otherwise injury of person or unit damage might happen.



The power supply to the heat pump unit must be grounded.

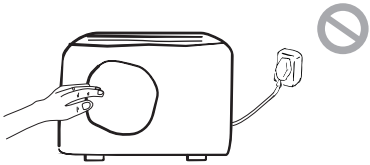
1.1 Safety precautions

The water inside the heat exchanger should contains no chloridion inside, and PH value among 6~8.

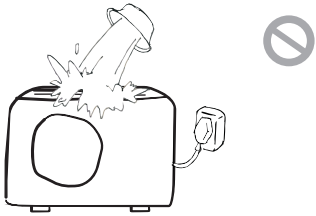


Make sure the power supply to the heat pump unit is off before any operations are done on the unit.

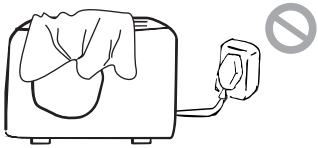
Do not insert any foreign objects into the air outlet grill when the fan motor is running. Otherwise injury of person or unit damage might happen.

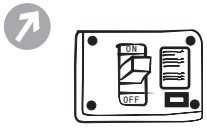


Make sure no water or other liquid drips into the electric box of the unit Otherwise the unit might be damaged.

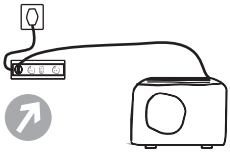


Do not clog the evaporator by paper or any other foreign objects, to keep the unit well ventilated.





It is mandatory to use a suitable circuit-breaker for the heat pump and make sure the power supply to the heater corresponds to the specifications. Otherwise the unit might be damaged.



Make sure to use a dedicated power line for the heat pump only. Do not add other appliances to the line.

1.2 Features and advantages

■ Advantages

☑ This unit is using the latest DC inverter technology. It can adjust its working frequency, so to give out its output according to the loading. It can work down to -25℃ with good COP.

☑ The unit is designed with easy installation that no refrigerant charging or copper pipe brazing is required on site. It can be widely used in house and villa.

☑ This unit is with environment-friendly refrigerant R410A, which also provides one of the highest energy efficiency ratings in the industry. Output of the compressor and therefore the energy input requirements are constantly monitored and adjusted at the most optimum level for the given indoor and outdoor environmental conditions and the user's desired demands from the system.

☑ Microprocessor control system contains several enhanced software features to make the operation of the system most advantageous and pleasing, under varying environmental conditions.

☑ Special vibration absorbers on the compressor allow operation of the system with ultra low noise.

☑ Microprocessor is programmed to allow operation under wide range of input voltages from 160V-260V and soft starting with lower current draw at each compressor start-up.

☑ Auto-restart function keeps all settings in memory and automatically resumes the operation after a power failure.

☑ Compressor crankcase heater and bottom plate heater are available as options for extreme cold conditions, enabling the unit to work in very low ambient temperatures with much lessened defrost frequencies. Both these optional heaters are electronically controlled based on the outdoor ambient temperatures and a sophisticated logic.

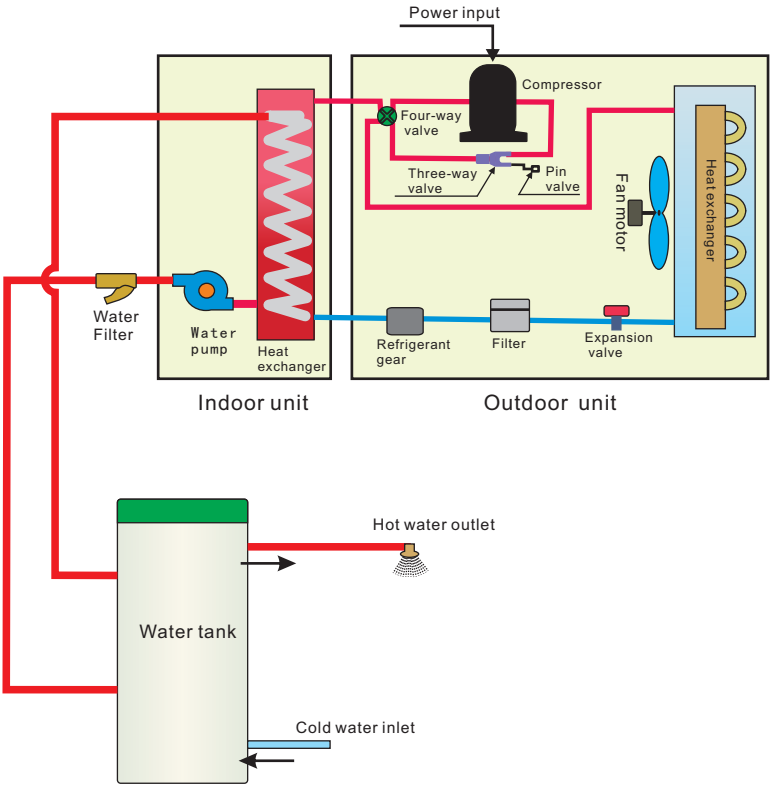
☑ Programmable timer function provides unattended operation of the system.

☑ Acrylic coated enhanced aluminum fins on the coil heat exchanger extends the fin life against corrosion and allows easier rainwater wash-down as well as faster defrosts.

1.3 System sketch

☑ Copper tubing in all heat exchangers are made by using the latest developments in the technology of inner grooved tubing by extending the area of heat exchange in a more compact coil, therefore increasing the operational efficiency.

■ System sketch

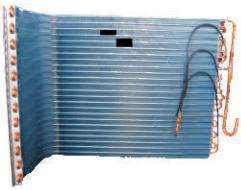


1.4 Main components

■ Main components

Compressor

Expansion valve



Heat exchanger

4-way valve

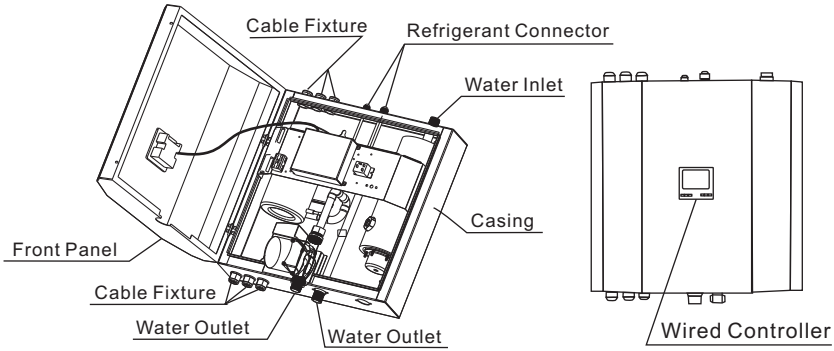
Water pump

Pressure switch

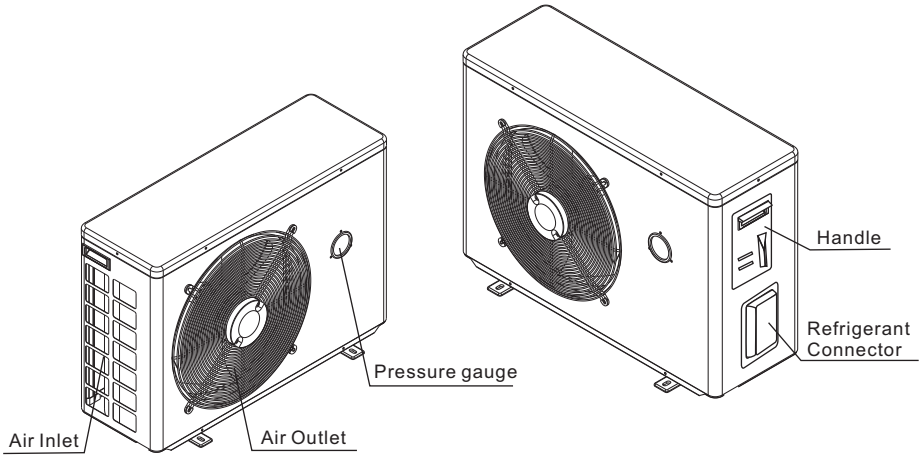
1.4 Main components

■ AVH-12V1D

Indoor



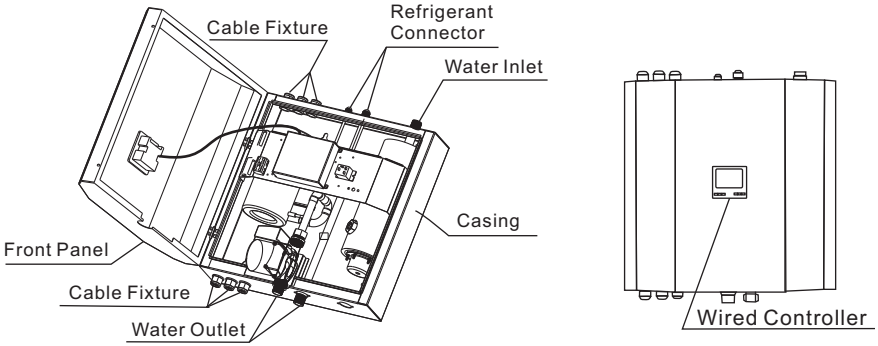
Outdoor



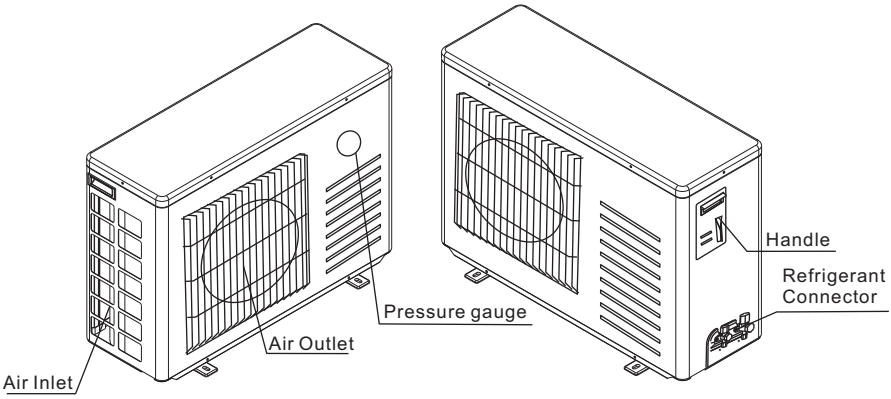
1.4 Main components

■ AVH-24V1D

Indoor



Outdoor

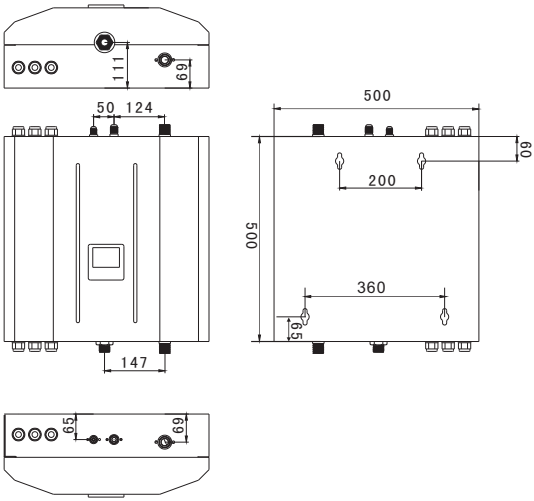


1.5 Outlines and dimensions

■ AVH-12V1D

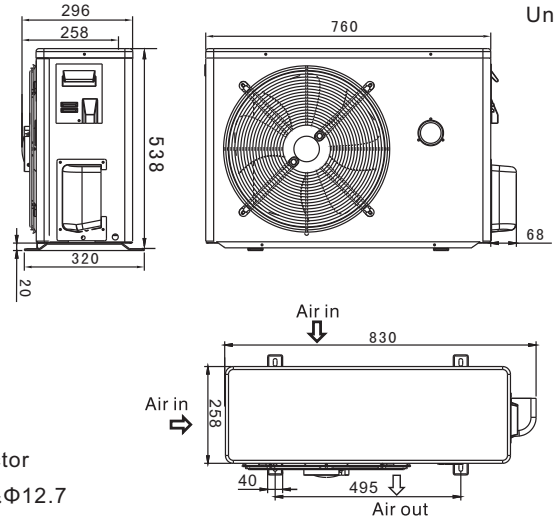
Indoor

Unit: mm



Outdoor

Unit: mm



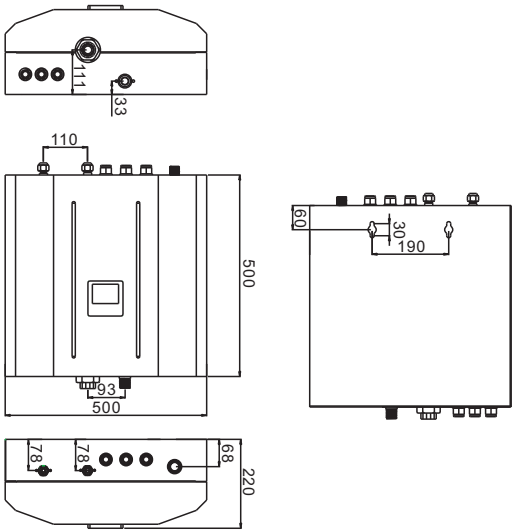
Refrigerant connector
dimension:Φ6.35&Φ12.7

1.5 Outlines and dimensions

■ AVH-24V1D

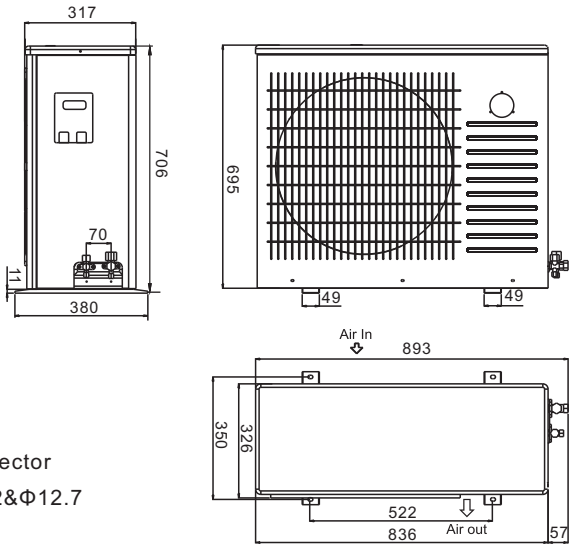
Indoor

Unit: mm



Outdoor

Unit: mm



Refrigerant connector
dimension:Φ9.52&Φ12.7

1.6 Specifications

■ AVH-12V1D

Type				AVH-12V1D	
Function				Cooling	Heating
Power supply				Single phase220-240V/50Hz/1PH	
Capacity	Cooling(heating)capacity		KW	3.3/1.3-4.2	3.8/1.4-5.1
			Btu/h	12000/4400-15000	13000/4800-18000
Dimension	Indoor	LxDxH	mm	500x500x220	
	Outdoor	LxDxH	mm	828x320x538	
	Water connector		inch	G3/4”	
	Gas connector		inch	1/2”	
	Liquid connector		inch	1/4”	
Temp.	Working range in cooling		℃	0℃~55℃	
	Working range in heating		℃	-25℃~33℃	
	Water outlet temp.		℃	7℃~52℃	
Weight	Indoor		Kg	18.5	
	Outdoor		Kg	33	
Others	Noise	Indoor unit	dB	15	
		Outdoor unit	dB	44	
	Fan speed	Outdoor unit	rpm	850	
	Refrigerant		Kg	0.845/R410A	
	Volume flow,max/nom/min		L/s	0.4/0.23/0.13	
	Room temp sensor		KΩ	5K(25℃)	
	Indoor coil temp sensor		KΩ	5K(25℃)	
	Outdoor temp sensor		KΩ	5K(25℃)	
	Outdoor coil temp sensor		KΩ	5K(25℃)	
	Outdoor discharge temp sensor		KΩ	50K(25℃)	

Rated condition of test:

Cooling: water inlet 12℃, water outlet 7℃,
outdoor dry bulb 35℃, wet bulb 24℃;
Cooling: water inlet 30℃, water outlet 35℃,
outdoor dry bulb 7℃, wet bulb 6℃;

The specifications air subject to change without prior notice.

For actual specifications of the unit, please refer to the specification stickers on the unit.

1.6 Specifications

■ AVH-24V1D

Type				AVH-24V1D	
Function				Cooling	Heating
Power supply				Single phase220-240V/50Hz/1PH	
Capacity	Cooling(heating)capacity		KW	6.1/2.15-8.05	7.0/3.7-9.0
			Btu/h	20810/7200-27500	22520/7911-28390
Dimension	Indoor	LxDxH	mm	500x500x220	
	Outdoor	LxDxH	mm	894x380x706	
	Water connector		inch	G3/4”	
	Gas connector		inch	1/2”	
	Liquid connector		inch	3/8”	
Temp.	Working range in cooling		℃	0℃~55℃	
	Working range in heating		℃	-25℃~33℃	
	Water outlet temp.		℃	7℃~52℃	
Weight	Indoor		Kg	26.5	
	Outdoor		Kg	52	
Others	Noise	Indoor unit	dB	25	
		Outdoor unit	dB	54	
	Fan speed	Outdoor unit	rpm	780	
	Refrigerant		Kg	1.57/R410A	
	Volume flow,max/nom/min		L/s	0.6/0.395/0.32	
	Room temp sensor		KΩ	5K(25℃)	
	Indoor coil temp sensor		KΩ	5K(25℃)	
	Outdoor temp sensor		KΩ	5K(25℃)	
	Outdoor coil temp sensor		KΩ	5K(25℃)	
	Outdoor discharge temp sensor		KΩ	50K(25℃)	

Rated condition of test:

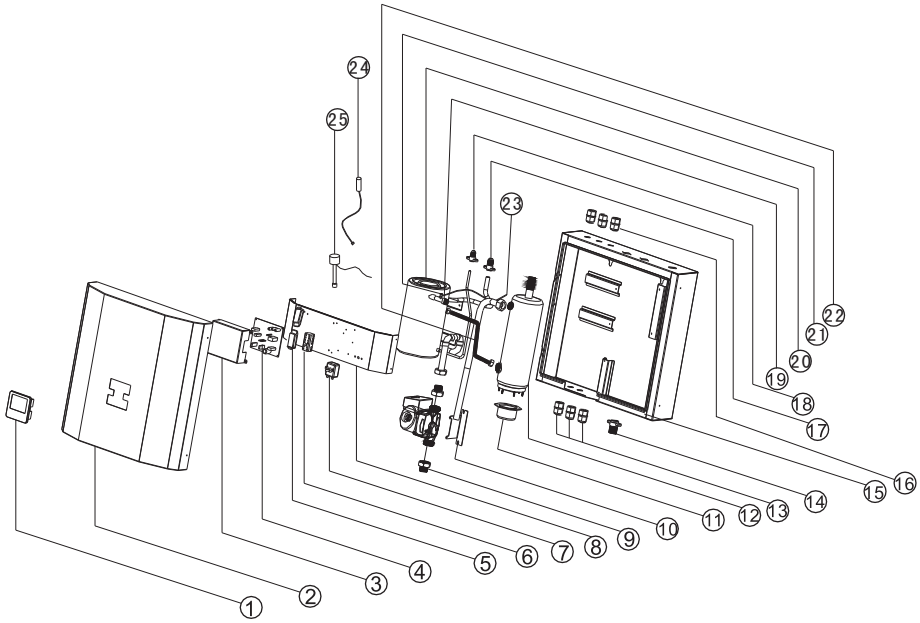
Cooling: water inlet 12℃, water outlet 7℃,
outdoor dry bulb 35℃, wet bulb 24℃;
Cooling: water inlet 30℃, water outlet 35℃,
outdoor dry bulb 7℃, wet bulb 6℃;

The specifications air subject to change without prior notice.

For actual specifications of the unit, please refer to the specification stickers on the unit.

1.7 Exploded view

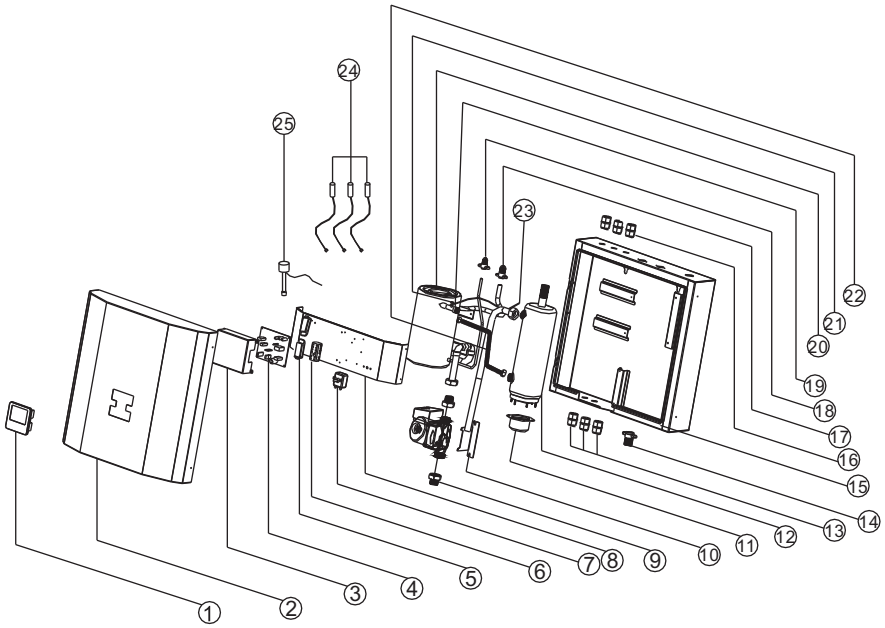
AVH-12V1D-Indoor unit



NO	Name	NO	Name
1	LCD Controller	14	Wate connector
2	Front panel	15	Casing
3	Electric box cover	16	Cable Fixture
4	Main processor PCB	17	Gas connector
5	Wire Clip	18	Liquid connector
6	Terminal block	19	Connector to Flexible Pipe
7	Mechanical temp. controller	20	Heat Exchanger
8	Bracket for Electronics	21	Discharge Valve
9	Water Pump	22	Flexible Pipe
10	Water Pump support	23	Drain Pipe
11	Cover for Electric Heater	24	Sensor
12	Electric Heater	25	Auto reset pressure switch
13	Cable Fixture		

1.7 Exploded view

■ **AVH-24V1D-Indoor unit**



NO	Name	NO	Name
1	LCD Controller	14	Wate connector
2	Front panel	15	Casing
3	Electric box cover	16	Cable Fixture
4	Main processor PCB	17	Gas connector
5	Wire Clip	18	Liquid connector
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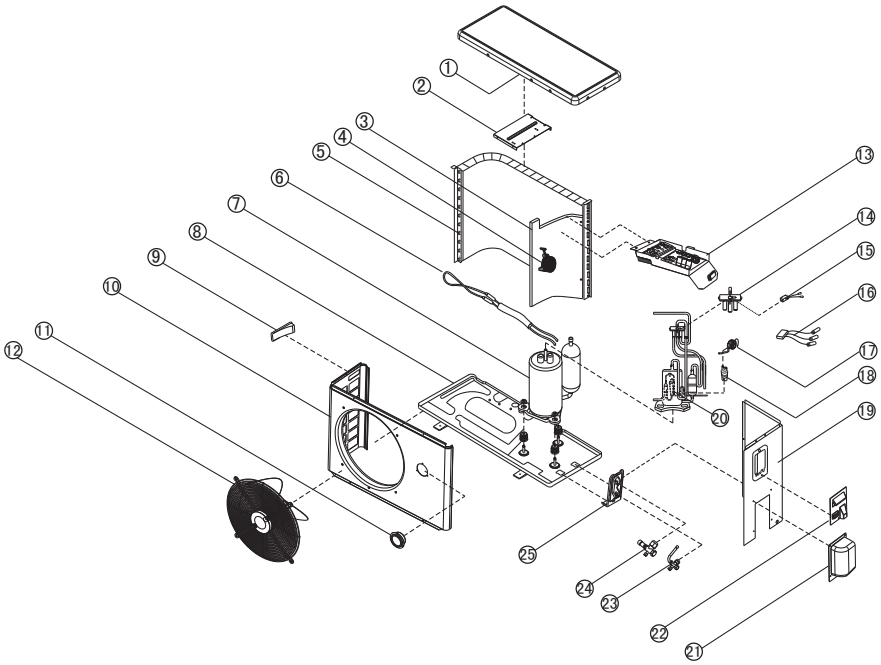
8	Bracket for Electronics	21	Discharge Valve
9	Water Pump	22	Flexible Pipe
10	Water Pump support	23	Drain Pipe
11	Cover for Electric Heater	24	Sensor
12	Electric Heater	25	Auto reset pressure switch
13	Cable Fixture		

1.7 Exploded view

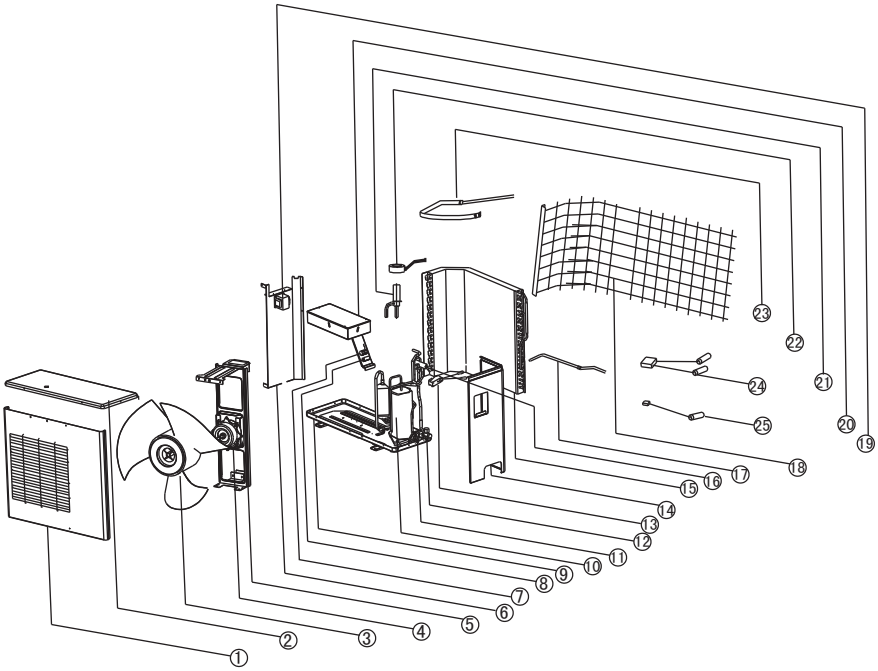
■ **AVH-12V1D-Outdoor unit**



NO	Name	NO	Name
1	Top panel	14	Four-way valve
2	Control box connect panel	15	Four-way valve coil
3	Bulkhead	16	Sensor
4	PFC transducer	17	Capillary
5	Condenser	18	Filter
6	Condenser Heater	19	Right plate
7	Compressor	20	One way valve
8	Bottom plate	21	Valve
9	Handle	22	Big Handle
10	Front panel	23	Gas Connector
11	Pressure	24	Liquid Connector
12	Axial Fan With External Rotor	25	Valve plate
13	Control system		

1.7 Exploded view

■ **AVH-24V1D-Outdoor unit**



NO	Name	NO	Name
1	Front panel	14	Side Plate
2	Top panel	15	Condenser
3	Outdoor Fan	16	Four-way Valve
4	Outdoor Motor	17	Condenser
5	Motor Bracket	18	Coil guard
6	Bulkhead	19	PFC Transducer
7	Terminal Block	20	Electronic Box
8	Wire Clip	21	Electronic Expansion Valve
9	Bottonm Plate	22	EEV Coil
10	Compressor	23	Compressor Heater
11	Liquid Connector	24	Sensor
12	Gas Connector	25	Compressor Discharge Sensor
13	F-Way Valve Coil		

1.8 Main functions

■ Memory function

The unit will recover its latest working settings automatically after power failure. The compressor restart interval time is 3 minute, to protect the compressor.

■ Compressor preheating

When the unit is powered on the first time and the compressor is not working, if outdoor ambient temp is lower than -5℃, compressor starts to preheat by itself. After compressor works, 3 hours after it stops, if outdoor ambient temp is lower than −3℃, compressor starts to preheat by itself.

When compressor is in preheating, if outdoor ambient temp is over 0℃, or unit needs to start the compressor , compressor preheating stops.

■ Output for external electric heater

When system runs in heating mode (heat pump), ambient temperature is below 10℃, and compressor has been running for 25 minutes, the controller will check the system every 15 minutes. The auxiliary electrical heater turns on when below conditions are met:

A. Compressor has been running at its highest speed;

B. Set temperature is 3℃higher than water temperature.

C. Water temperature rises less than 1℃ in over 15 minutes.

When water temperature reaches the preset value, and keeps stable for 1minute or compressor stops running, this auxiliary electrical heater turns off, when system begins to do the checking as above.

■ Limit on Water outlet temperature (when air temperature works as the set temperature)

When (water outlet temperature) WOT ≥34 ℃, the controller will set a limit on compressor' s running speed, with its current running speed as maximum.

When WOT ≥36 ℃, compressor' s running speed will be lowered down towards its lowest speed, until water outlet temperature drops below 34 ℃. Then the controller stops lowering compressor' s running speed and

begin to raise it back, but its maximum speed will be one level lower than its previous speed before this lowering process.

When WOT≤32℃ and compressor keeps on running 60 minutes without any frequency drop or system shutdown for protection, then the limit on compressor' s running speed will be released.

When WOT≥38℃ or compressor' s running speed is lowered to its lowest speed but water outlet temperature is still higher than 34℃ after 2 minutes, then compressor stops. After water outlet temperature drops below 32 ℃, compressor restarts.

■ Defrosting function in heating mode

Below is the procedure of defrosting operation in heating mode:（refer to EEPROM table for detailed parameter setting)

a) Defrosting operation starts when below conditions are met, when defrosting light flickers.

1) Condensing coil temperature below -3℃ and lasts for 3 minutes.

2) Compressor has been running for not less than 5 minutes

3) Total running time of compressor is longer than interval between two defrosting operations

b）When one of below condition is met, the system quits from defrosting operation

1）Defrosting operation lasts more then 8 minutes;

2) Defrosting operation lasts for more than 10 seconds, and condensing coil temperature is higher than 17℃.

■ Evaporator overheating protection

When evaporator temperature≥52℃, system enter into evaporator overheating protection, and compressor lowers down its running speed towards F1, until this temperature drops lower than 49℃. Then compressor takes the speed 1 level lower than its previous speed before overheating protection as its maximum running speed.

1.8 Main functions

When this Temp drops down to 47℃ and lasts for 5 minutes, the limit on compressor running speed will be released.

If evaporator temperature rises above 55℃ and lasts for 5 seconds, then compressor stops. And it will resume its normal operation until this temperature drops down below 47℃.

■ Protection against Compressor' s improper operation

During compressor' s start-up or running, if the controller detects no feedback from compressor, or abnormal loads inside compressor, or improper start-up, compressor will stops for 3 minutes and then re-start. (Compressor can re-start at most three times when fed with power; if this problem still exists, the controller will judge it as compressor driving-failure, and relevant protection will be triggered. Then compressor can only be turned on after problem solved and system re-fed with power.

■ Protection against Improper Current

When system running current is bigger than a certain value, controller will impose relevant limits on compressor' s running frequency, then its running speed will stop rising.

When this current 0.5A smaller than this certain value, system' s running speed drops by 1Hz/second towards 30Hz, until running current is smaller than 16A.

When this current is 1A bigger than this certain value, controller will stop the compressor no matter at what speed it runs.

■ Compressor gas discharge temperature protection

When compressor gas discharge temperature exceeds 92℃, the controller will keep its running frequency from rising. When this temperature exceeds 97℃, the controller will record the compressor' s running speed, and lower it down towards 30Hz. If compressor gas discharge temperature drops below 87℃, then this process stops and controller adjusts compressor' s running speed according to difference between room temperature and preset temperature; However, its

1.8 Main functions

maximum running frequency will be 1 level lower than recorded value.

When compressor gas discharge temp. is below 92℃ and lasts for 10 minutes, its maximum running frequency will increase by 1 level. If this discharge temperature exceeds 103℃, the compressor stops, and outdoor fan motor turns off in 15 seconds. And the system turns on until gas discharge temperature drops below 90 ℃ and compressor has been off for 3 minutes.

■ Delayed Start-up of Compressor

After compressor stops, it can only restart in 3 minutes (this protection is functional in cooling mode or when system changes its operation mode between dehumidification and heating). However, when the unit is powered the first time, compressor starts up in 1 minute instead, to ensure proper communication between indoor and outdoor unit.

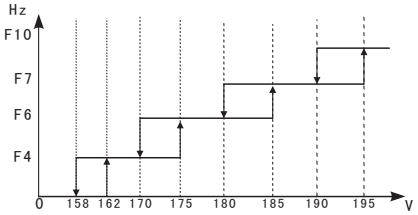
■ Protection against Low Voltage

When voltage supplied is lower than 190V and this condition lasts for 30 seconds, limits will be imposed on compressor' s running speed.

When voltage supplied is higher than 195V, the limitation is cancelled.

When voltage drops below 158V, the system turns off and relevant error code will be shown in the wired controller.

When voltage rises back above 162V, the system recovers its operation.

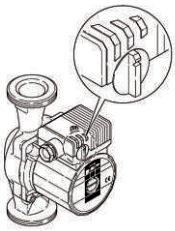


1.9 Water pump

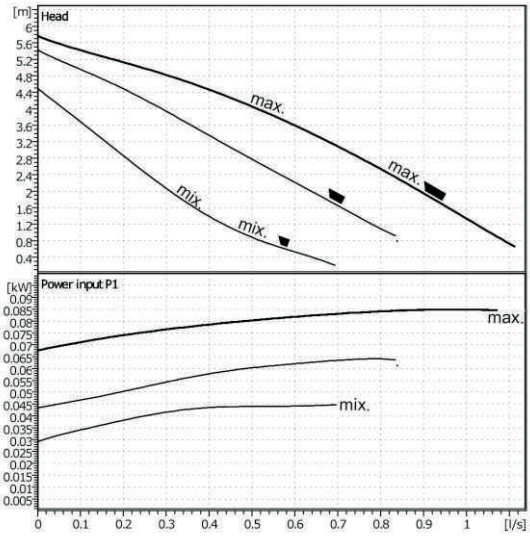
Setting the pump speed

The pump speed can be selected on the pump.

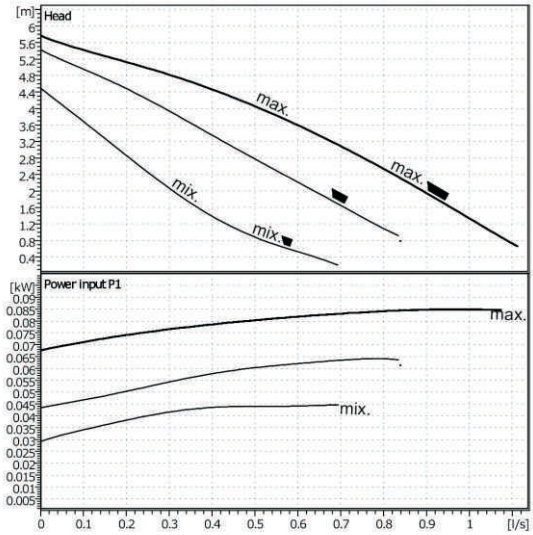
The default setting is highest speed(Ⅲ).If the water flow in the system is too high(e.g:noise of runing water in the installation) the speed can be lowered (Ⅰ/Ⅱ).



The available external static pressure (ESP, expressed in mH_2O) in function of the water flow (l/min) is shown in the right picture.



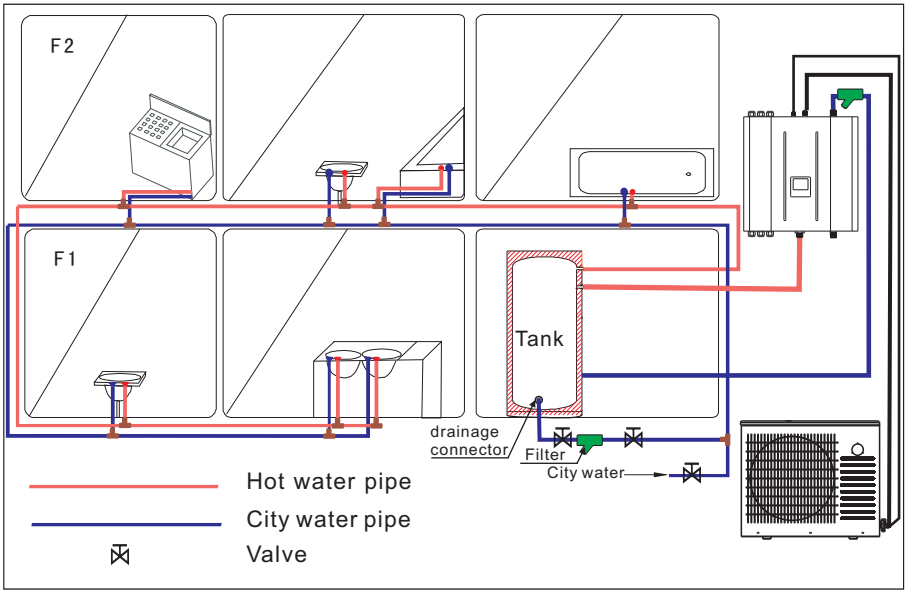
RS-15(for AVH-12V1D)



RS-25(for AVH-24V1D)

2.1 System figure

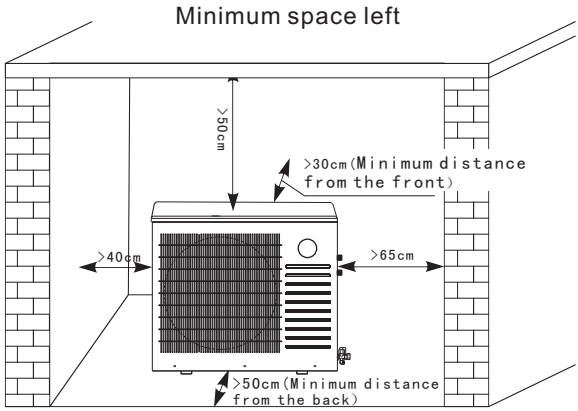
■ System figure.



■ Installation precautions

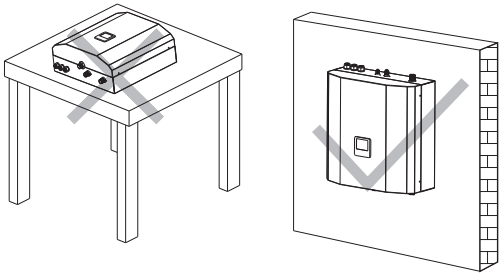
1.The installation, dismantlement and maintenance of the heat pump must be performed by qualified personnel.

2.The unit must be installed outdoors in an area with sufficient clearance to provide free air circulation through the coil. Please refer to the following figure to choose the right place for the unit. .

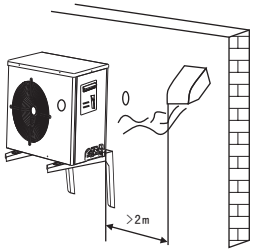


2.2 Installation precautions

3.The indoor unit should be hang on the wall and keep the water connector downwards.

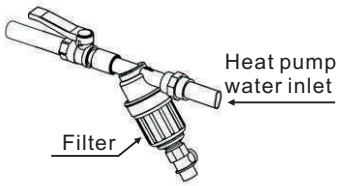


4.The outdoor unit should be placed at least 2M from the lampblack outlet of kitchen,to keep the unit clean.

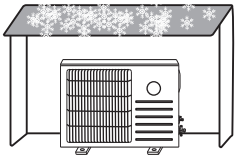


5.All the hot water pipe and water connections should be insulated, to reduce the energy loss.

6.A mesh filter must be installed in front of the water inlet of the unit and water tank, for keeping the water quality and collecting impurity contained in the water. Take care to keep the water filter mesh towards the bottom. Check valve is recommended to be installed at both sides of the filter, so as to clean or change the filter in a easier way.

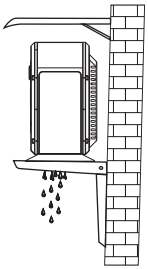


7.Shield the unit from direct sunshine, rain or snow, but never cover the unit which will cause the bad ventilation.



2.2 Installation precautions

8.Please install the drain connector to the unit when necessary. In some cold areas (temperature below 0), please don' t use the drain connector, otherwise it may clogged by ice.



9.Install the unit and water tank close to each other as much as possible to reduce the distance between them, so to reduce the energy loss.

10.The unit should be free from corrosive and moisture surrounding. Otherwise the lifetime of the unit might be shortened.

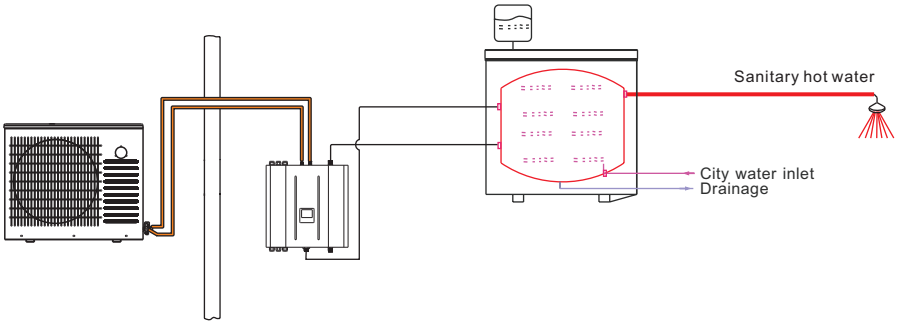
11.Keep the water system with proper water pressure. Add a external pump if the pressure inside is too small.

12.If the ambient temperature can be lower than 0℃ in winter, ensure that the whole system is protected against freezing. When using glycol solution, make sure that the water/glycol mixture is well proportioned.

2.3 Applications

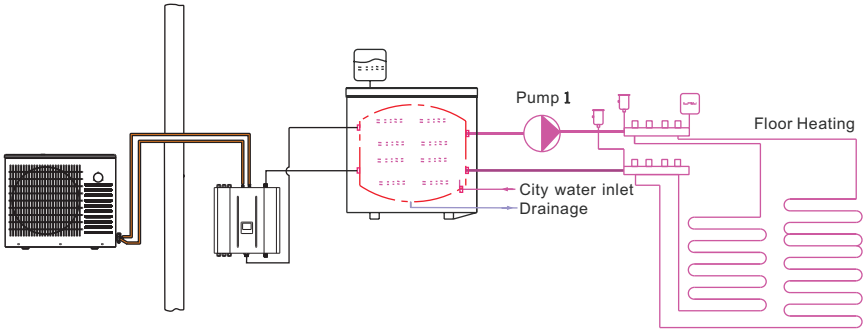
Applications

Application 1: This installation is for supplying sanitary hot water only.



Sanitary hot water

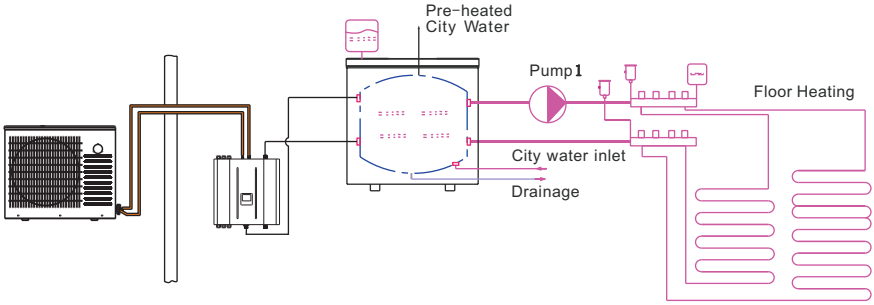
Application 2: This installation is for supplying floor heating hot water only.



Floor Heating

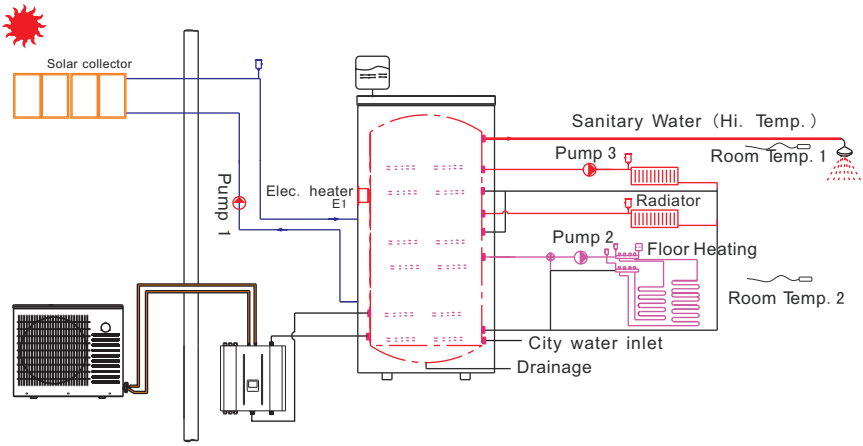
2.3 Applications

Application 3: It provides both floor heating hot water and pre-heated sanitary water.



Floor Heating and Pre-heated Sanitary Water

Application 4: It provides hot water for central house heating and hot water system.

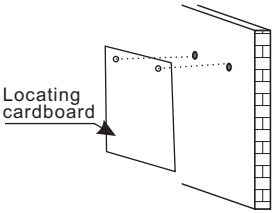


Heat Pump and Solar System for Heating & Sanitary Water

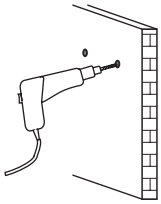
2.4 Installation

■ Indoor unit installation

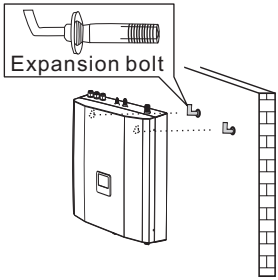
For the installation of the indoor unit, please refers to the followings:



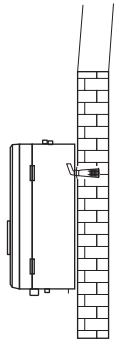
1.Use the locating cardboard to mark the positions of the indoor unit on the wall.



2.Drill the holes on the wall.



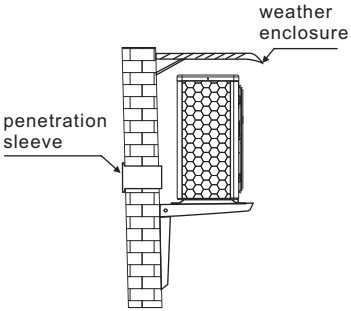
3.Insert the expansion bolts (Terminal diameter less than 16mm) into the holes.



4.Hang the indoor unit on the expansion bolts.

Note: The wall must strong enough to hang the unit on.

The refrigerant piping and signal cable between indoor&outdoor unit should go through the wall by using a wall sleeve.



2.4 Installation

■ Outdoor unit installation

1. The unit must be located on a flat, solid, preferably cemented surface.

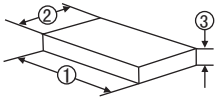
2. when installing the unit, introduce a tilt of 1cm/m for rain water evacuation

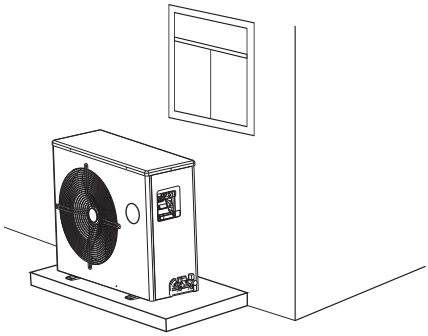
3. when installing the unit in harsh climatic conditions, sub-zero temperatures, snow, humidity.., it is recommended to raise the unit off the ground by about 20cm.

4.It is recommended to have a base with following size for these units:

5.Rubber vibration absorbing mountings are recommended.

6.When sitting the unit, take care to leave sufficient free space all around it for carrying out maintenance.





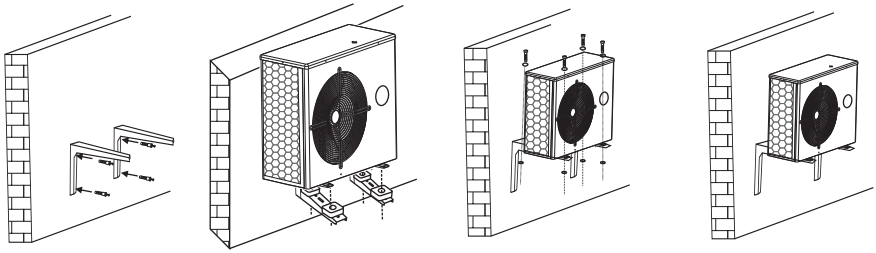
NO	AVH-12V1D	AVH-24V1D
①	1028	1094
②	738	906
③	300	300

1. Fix the bracket on the wall with expansion bolts.

2. Place the outdoor unit on the bracket. A vibration absorber is recommended to

reduce the noise of the outdoor unit.

3. Fix the unit to the bracket.



2.4 Installation

■ Wiring

Precaution:

1.It is recommended to use a suitable breaker for the heat pump and make sure the power supply to the heater corresponds to the specifications. Otherwise the unit might be damaged.

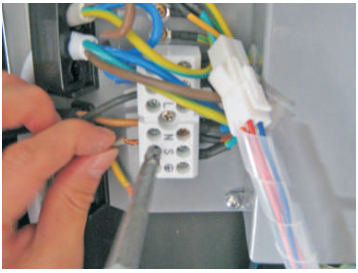
2.The power supply to the heat pump unit must be grounded.

3.Cable should be fixed tightly, to ensure it won't get lossen.

1.Take off the screw on the side of the unit.

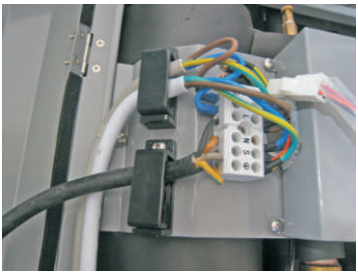
2.Open the indoor unit.

3. Take off the cable fixture and insert the power cable through the fixture(customer can choose which cable fixture is more convenient, the one on the top or the one on the bottom of the unit).



4. Connect the power cable to the terminal block.
Please refers to the wiring diagram on the indoor unit.

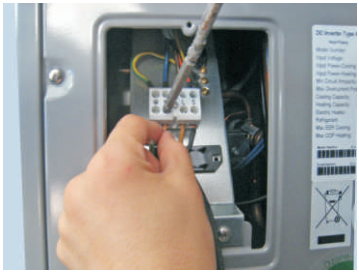
2.4 Installation



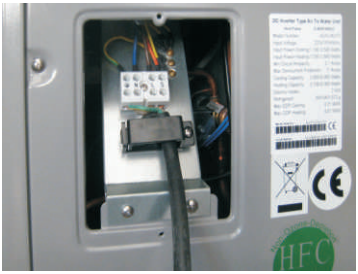
5. Fix the cable with cable fixture, to ensure it won't get lossen.

6. Take off the screw on the handle of the outdoor unit.

7. Take off the small handle.



9. Connect the other side of the power cable to the outdoor unit, according to the wiring diagram.



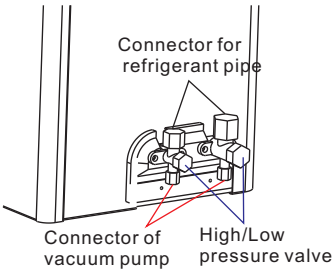
10. Fix the power cable.

11. Wiring done!

2.4 Installation

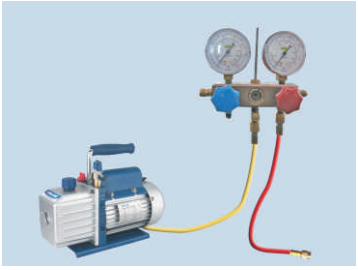
Connection of refrigerant pipe

Note: When vacuuming the system, please don't turn on the high/low pressure valve. Otherwise refrigerant leakage

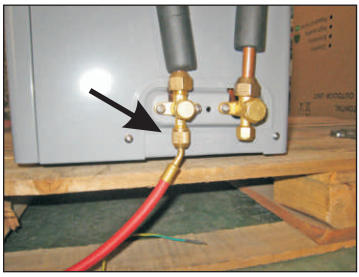


1. Connect the refrigerant piping to the indoor unit.

2.Connect the other side of the refrigerant pipe to the outdoor unit.



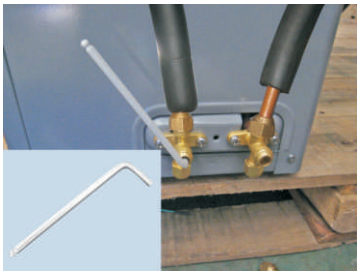
3. A vacuum pump and pressure gauge is needed. Connect the pressure gauge to the vacuum pump.



4. Take off the copper nut on the high pressure connector of the unit. Connect the other pipe of the pressure gauge to the valuve as shown in the picture. Open the pressure gauge and start the vacuum pump.

2.4 Installation

5. Vacuum the unit for at least 15 minutes till negative value shown on the pressure gauge. Turn off the vacuum pump and install the cooper nut back to the high pressure connector.



6. Use a 5mm hex wrench to open two valves on the unit as shown in the picture.

Note:Small leakage may happen during the process.This is caused by the shape change of the o-ring inside due the low temperature. Leakage stops once the valves are fully opened.

7. Put the copper nut back. Tighten them with a wrench.

It is recommended to check the leakage with some suds water after installation.

2.5 Application of the extra sensor kit

■ Application of the extra sensor kit

When the customer use our heat pump unit for house heating purpose only, he can connect this extra long temperature sensor kit to our wired controller, so the unit can read the room temperature. In this way, the unit can provide hot water to the house heating system when the room temperature doesn't get the set value, or stop providing hot water when room temperature meets the set value.

Size of the kit: 85*85*30 mm

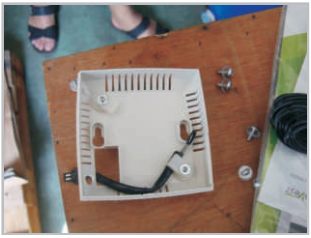
How to install the room temperature sensor kit:

1.Take the short room temperature sensor out from the indoor unit.

2. Open the box of the room temperature sensor kit.

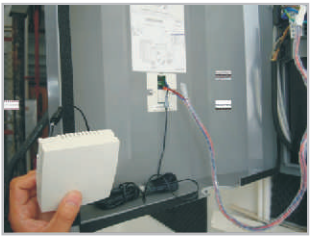
2.5 Application of the extra sensor kit

3.Put the short room temperature sensor picked up from the indoor unit into the box.



4.Connect the room temperature to the extra long signal cable, which packed inside the accessories bag. And then connect the other side of this extra long signal cable to the connector inside the indoor unit.

Fixed! Now you can put the room temperature sensor kit to wherever you want, to read the room temperature there.



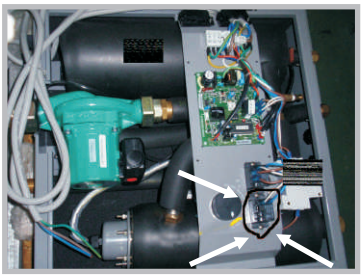
2.6 Control of external electric heater

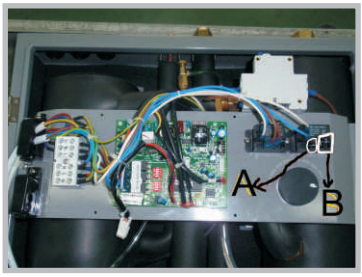
■ Control of external electric heater

Customer can do as followings to connect the a external electric heater to the unit:

1. Open the indoor unit.

2. Find the relay as marked in red below.





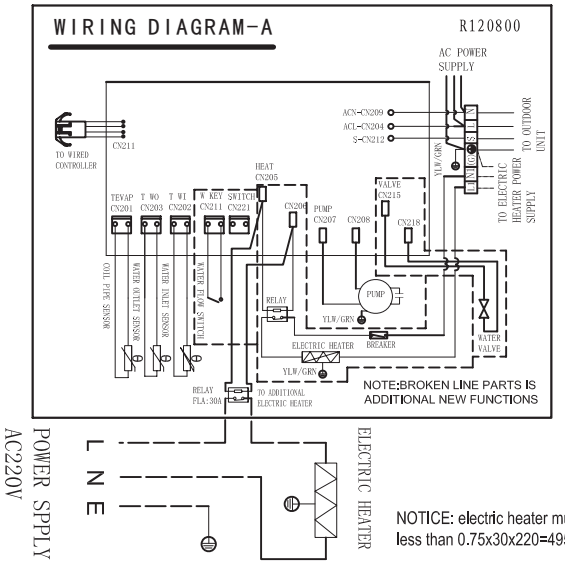
3. Connect the power or signal cable from the electric heater, to this relay. One cable should be connected to position A, while the other cable should be connected to any one of the connectors at position B.

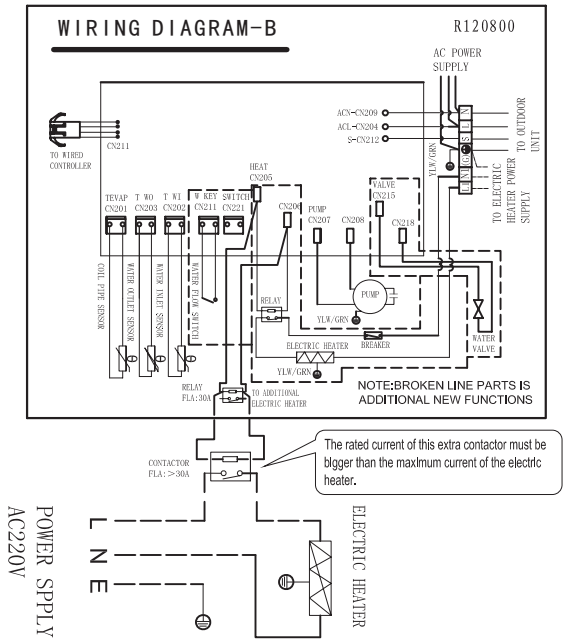
4. If according to our heat pump logic, the external electric heater should be turned ON, our unit will send its signal to this relay, so to close the relay, to start the electric heater. The maximum allowable current this relay can bear is 30A.

If directly connect the power cable of the electric heater to our unit, please refer to the wiring diagram-A in the next page.

If the maximum current of the electric heater is more than 30A, an extra contactor is needed, please refer to the wiring diagram-B in the next page.

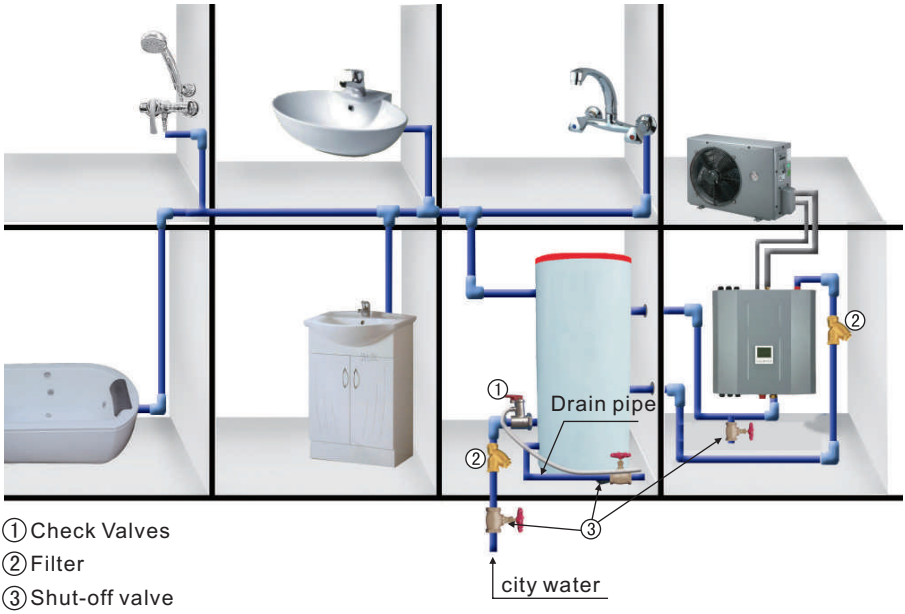
2.6 Control of external electric heater





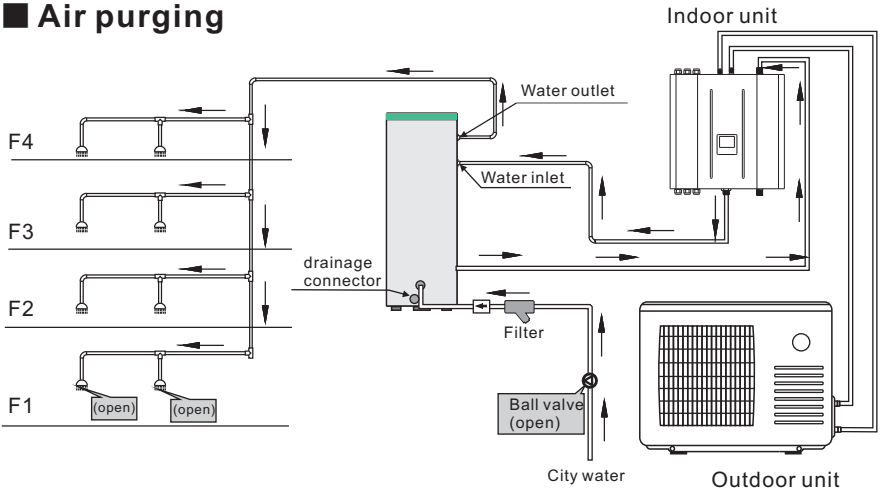
2.7 Air purging

Piping connection figure



①Check Valves
②Filter
③Shut-off valve

■ Air purging



2.7 Air purging

The whole water system of this unit should be a closed water system. Because of this, please purge the air inside as following after all the water pipe connection work finished:

1.Open the water tap at the lowest level, so the air inside the sanitary water system can be purged out by the pressure of water.
2.Open the filling valve to fill the whole water tank and the water system with water (this process may take around 20 minutes).
3.Close all the valves when there is water coming out from the end of the water system.
4.Air purging finished!

Please refers to the following figures:

If the water supply is cut off, the unit will show protection code on its screen. The customer should cut the power off till the water coming again.
It is necessary to purge the air again when restart the unit after the water was cut off.

2.8 Pre Start-up

■ Pre Start-up

Before starting up the unit, a certain number of verifications must be performed on the installation to ensure that the unit will operate under the best possible conditions. The check list below is not exhaustive and should only be used as a minimum reference basis:

1.Make sure fan rotates freely.

2.Inspect all water piping for flow direction.

3.Verify all system piping is correct for operation as per installation requirements.

4.Check voltage of the unit power supply and make certain voltage is within authorized limitations.

5.Make sure the unit is properly grounded.

6.Check the presence of protective and breaking devices.

7.Check all electric connections for tightness.

8.Check all piping for leaks and air is well ventilated.

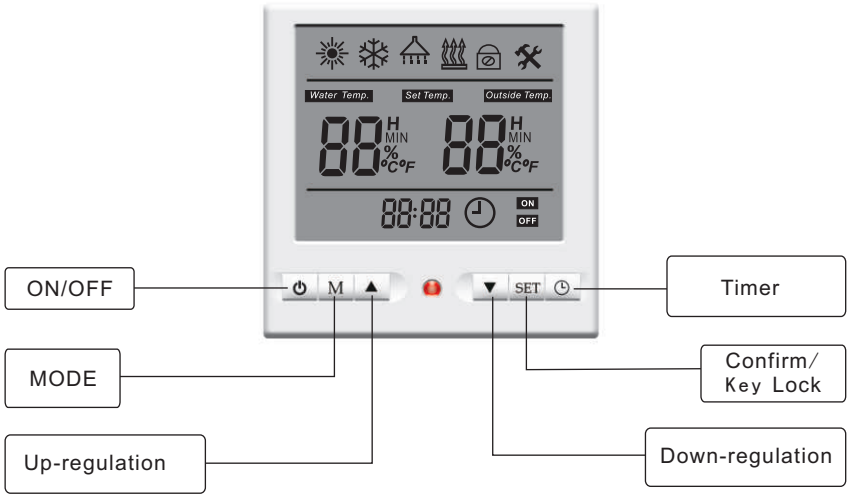
Unit Start-up

After ensuring all electric connections conform to the local regulations, follow the Operation Instructions to start-up the unit.

After start-up the unit, if there is a abnormal sound, please shut off the power supply immediately to ensure the safety of the unit.

3.1 Introduction of operation panel

■ Introduction of operation panel



Display	Meaning	Function
	Heating	When the unit works in heating mode , ☀ is ON.
	Cooling	When the unit works in cooling mode , ❄ is ON.
	Hot water	When the unit works in hot water mode , is ON.
	Defrosting	When the unit works in defrosting , is ON.
	Key lock	When buttons are locked , is ON.
	Parameter setting	When parameter setting is activated , is ON.
88	value or code	To display temperature, timer, parameter, error code and so on.
88:88	Time	The unit will clear its clock time when power failure happens.
Water Temp.	Water temperature	When water temperature mode is activated, Water Temp. is ON.

3.2 Operation instruction

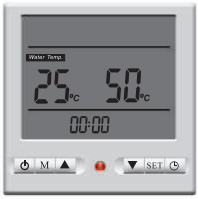
Set Temp.	Set temperature	When changing the set temperature, Set Temp. is ON.
ON OFF	Timer function	When timer function is activated, ON OFF is ON.

■ Operation instruction

Standby

The unit is standby when it is fed with power.

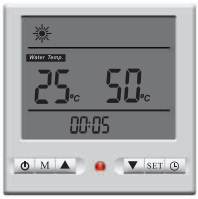
※The unit will clear its clock time when power failure happens. The customer needs to set the time again.



ON/OFF

When the unit is standby, press ⏻ to turn on the unit. The unit will work in its last working mode. Press ⏻ again to turn off the unit.

※The unit will recover its latest working settings automatically after power failure.



Mode selection

Keep on pressing M button to choose water temperature or air temperature as the set temperature. When water temperature works as the set temperature, Water Temp. is ON; When air temperature works as the set temperature, Water Temp. is OFF.

Mode selection

Press M to choose the unit operation mode. It comes in the sequence: ☀ →Heating、❄ → Cooling、⌂ → Hot water.

3.2 Operation instruction

Temperature setting

When the unit is ON, press ▲ once, the set temperature increases by 1℃; press ▼ once, the set temperature decreases by 1℃. Keep on pressing ▲ or ▼, the temperature can be increased or decreased by 5 ℃.

When changing the set temperature, *Set Temp.* is ON.

Parameter setting

When power is fed and unit is off , press ▲ or ▼ to choose target Parameter.

Press SET to activate parameter setting process when parameter flickers. User can set its value with button ▲ or ▼ ; Press SET again to confirm the setting work: otherwise the setting Value will not be saved. and the system will exit this parameter Setting program automatically in 10 seconds, or by pressing.

Parameter 1
Parameter 1 indicates the local time. The time is always presented in the 24-hour system

Parameter 2
This parameter has no function in this unit.

Parameter 3
Parameter 3 indicates the duration time for back light. It can be set to 00, 10, 20, and 30. While 00 means the back light is always ON, and 10, 20, and 30 means the duration time for back light is 10 seconds, 20 seconds and 30 seconds.

3.2 Operation instruction

Timer function

To set the ON timer, press ◷ button. ◷ ON turns on and blinks. Press ▲ to set the timer in hours, and ▼ to set the time in minutes. After it is done, press SET to confirm the ON timer setting and enter the OFF timer setting, with ◷ ON/OFF blinks. Set the OFF timer by pressing ▲ and ▼. After this done, press SET to confirm the OFF timer setting, with ◷ ON/OFF shown on the operation panel, indicating that the timer setting is finished.

If the ON timer or OFF timer setting is not confirmed by pressing SET, the setting value is not saved.

The timer setting can be cancelled by keeping on pressing ◷, with fading from the operation panel.

▲Timer ON

Timer ON setting doesn't function when the unit is working. It will be activated when the unit is turned OFF.

▲Timer OFF

Timer OFF settings only functions after the unit starts. It can be activated when the unit is turned ON.

Key lock

When the unit is ON, press SET for 5 seconds, to lock all the buttons, with 🔒 shows. Press SET for 5 seconds again, to unlock all the buttons.

4.1 Failure codes

■ Failure codes

Error Codes	Causes	Ways to check and remedies
E0	1.Wire connection between wired controller and PCB open or short-circuited	1.Check whether the wire connection gets loose. Fasten it.
	2.Wired controller failure.	2.Change it.
E1	1.Wire connection between wired controller and PCB open or short-circuited	1.Check whether the wire connection gets loose. Fasten it.
	2.Wired controller failure.	2.Change it.
E2	1. temp. sensor open or short-circuited	1. Measure with a multimeter at 20K to check whether it is shirt-circuited or open. If yes, change it..
	2.temp. sensor resistance drifting	2.Measure with a multimeter at 50K to check the sensor resistance. Take ambient temp. into consideration. If it isdrifting, change it.
	3.Temperature sensors not well connected to the wired controller.	3.Check whether the sensor connection gets loose. Fasten it.
F2	1. water inlet Temp sensor failure	1. Check whether the sensor connection gets loose. Fasten it. 2. Wire connection between wired controller and indoor PCB open or short-circuited. 3. water inlet Temp sensor resistance drifting.
	2. water outlet Temp sensor failure	1. Check whether the sensor connection gets loose. Fasten it. 2. Wire connection between wired controller and PCB open or short-circuited. 3. water outlet Temp sensor resistance drifting.
	3. Coil Temp sensor failure	1、Check whether the sensor connection gets loose. Fasten it. 2、Wire connection between wired controller and indoor PCB open or short-circuited. 3、Temp sensor resistance drifting. temp. sensor resistance drifting.
F1	Communication failure	1、Check whether port gets loose. Fasten it. 2、Change the PCB. 3、Change the outdoor PCB
F4	Compressor drive failure、IPM failure、IPM protection (overload)、drive protection	1.Check whether PFC transducer gets loose. Fasten it. 2.Change PFC transducer.
F3	Current or Voltage detector failure	1.Change PCB
F5	EEPROM failure	1、Check whether EEPROM gets loose. Fasten it. 2.Change EEPROM

4.2 Maintenance

F6	Too highr coil Temp in heating	1. Check the water flow of the unit 2. Too high ambient and water Temp. Reduce the set water Temp.
	Too high pipe Temp in cooling	1.Check the water flow of the unit 2.Too low ambient and water Temp.Increase the set water Temp.
	Over-current protection	1.Check the water flow of the unit. 2. Too high (low) ambient, and too high(low) set water Temp. Decrease or increase the set water Temp.
F7	Too high or too low voltage	1.Check the voltage of the power supply. 2.Change the outdoor PCB
F8	Pressure switch failure	1.Check the pressure of the system 2.Change the pressure switch
F9	EEPROM failure	1.Check whether EEPROM gets loose. Fasten it. 2.Change outdoor EEPROM
Fb	Ambient temp. sensor failure	1、Check whether the sensor connection gets loose. Fasten it. 2、Wire connection between wired controller and PCB open or short-circuited. 3、Temp sensor resistance drifting.
	Pipe temp. sensor failure	
	Compressor discharge temp. sensor failure	
Fc	System protection caused by too high(low) pressure	1. Measure the high (low) pressure switch with a multimeter to check whether it is shirt-circuited or open. If yes, change it. 2.Check the water flow of the unit.
Fd	System protection caused by the ambient Temp.	1. Check the ambient Temp sensor. 2. Check whether the ambient Temp is too high(low) for working (Ambient lower than -1℃or higher than 65℃ in cooling, lower than -25℃ or higher than 33℃ in heating).

■ Maintenance

1.It is forbidden to change the inner structure and wiring of the unit. Otherwise injury of person or unit damage might happen.

2.If the unit fails to work properly, please cut the power supply immediately. The maintenance work must be performed by qualified people.

3. “Failure check list” in this manual is helpful to find out and fix the failure of the unit.

4.After long time running, the evaporator coil may get dirty, which will affect the performance of the unit. It is suggested to clean the surface of the coil occasionally.

4.2 Maintenance

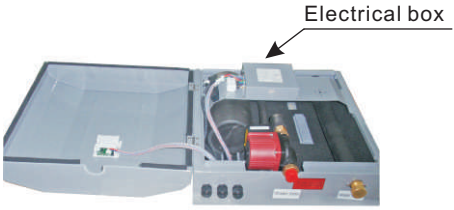
Maintenance of the electric components

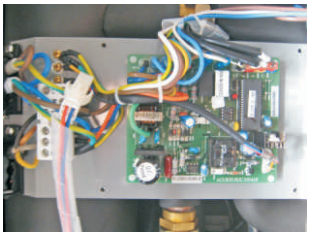
indoor

1、Cut off the power supply.

2. Open the doorofindoor unit and then take off the screws around the electrical box.

3. Do the maintenance of the electrical parts.





outdoor

1.Cut off the power supply.

2.Take off the screws on the front panel, and take away the front panel.

3. Take off the screws on the right side panel, and take away the right side panel.

4.Do the maintenance of the electric parts.

5.After done, install the right side panel and front panel back.

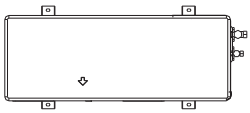


Figure 1

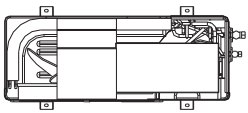
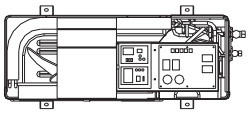


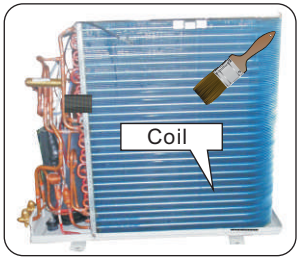
Figure 2



▲ Opening view of the unit

4.2 Maintenance

Condenser Coil



The condenser coils donot require any special maintenance, except when they are clogged by paper or any other foreign bodies. Cleaning is by washing with detergent and water at low pressure, and then rinsing with clean water:

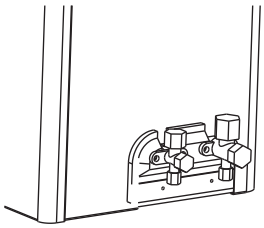
1. Before cleaning, make sure the unit is off.
2. Inner of the unit must be cleaned by qualified person.
3. Donot use gasoline, benzene, detergent etc. to clean the unit. And donot spray with insecticide. The unit may be damaged. The cleanser special made for air conditioner cleaning is recommened.
4. Spray air conditioner cleanser into the coils. Let the cleanser sit for 5~8 minutes.
5. Then, spray the coil with clean water.
6. An old hairbrush works well for brushing surface dirt and lint off the fins. Brush in the same direction as the slots between the fins so the bristles go between the fins.
7. After cleaning, use a soft and dry cloth to clean the unit.

Gas Charging

even under severe operating conditions. If your unit needs recharging, then it has a leak, and adding refrigerant will not solve the problem. The leak must be located and repaired.

1.Gas charging must be performed by qualified person.

2.One can find out whether the system has enough refrigerant inside by checking the low pressure inside the system.



4.3 Trouble shooting

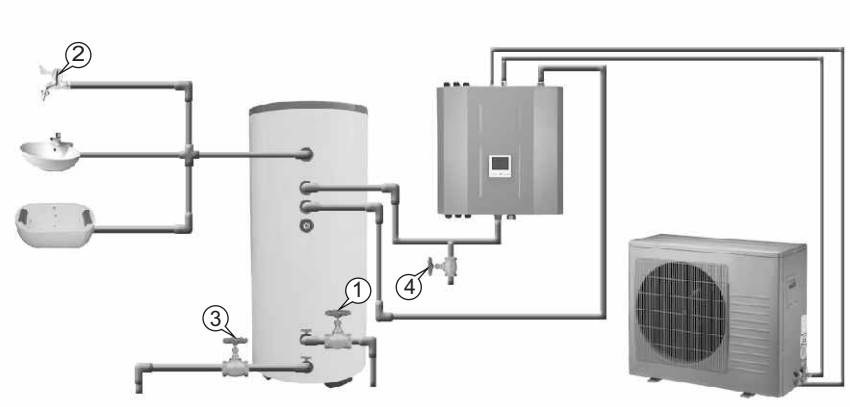
Cleaning of the filter

The Y-filter must be cleaned occasionally to ensure the water flow of the water system.

Drainage

please follow the instruction to drain out the water :

1. Shut off all the water inlet.
2. Drain out the water in the water system by opening the water tap at the highest position of the system.
3. Drain out the water in the tank by opening the valve to the drainage connector on the tank.
4. Drain out the water in the heat pump system.



4.3 Trouble shooting

■ Trouble shooting

Malfunction	Possible Causes	Remedies
Heat pump unit is out of operation	1.Power supply cut-off	1.Check the power supply.
	2.Power fuse burnt out	2.Check whether the unit is well grounded. If yes, check the fuse and change it if necessary.
	3.Unit protection	3.If the protection is caused by the failure, please refers to the failure code list and fix the failure before restarting the unit.
	4.Loose connection of power cables	4.Check the connections.
	5.Compressor failure	5.Replace the compressor.
Fan is out of operation	1.Fan motor wire loose	1.Check the wire connections.
	2.Fan motor burnt	2.Change the fan motor.
	3.Fan motor relay fails	3.Change the fan motor relay.
Low heating capacity	1.Coil fins are dirty	1.Clean the evaporator coil
	2.Air inlet/outlet blocked	2.Remove any object that blocks the air circulation of the unit.
	3.Lacking of refrigerant.	3.Inspect the unit for leakage and fix it if any. Discharge all refrigerant and charge the unit again with right amount.
Too high noise from the water pump, or no water flow when the water pump is running.	1.Lacking of enough water.	1.Check the water filling device. Fill the system with enough water.
	2.Air inside the water system.	2.Purging the air out.
	3.Water valve closed.	3.Check all the valves to ensure they are fully opened.
	4.Filter is blocked	4.Clean the filter
Too high compressor discharge pressure	1.Too much refrigerant.	1.Discharge all refrigerant and charge the unit again with right amount.
	2.Air inside the refrigerant system.	2.Discharge all refrigerant and charge the unit again with right amount.
	3.Too small water flow	3.Check the water flow of the system. Use a bigger pump if necessary.
	4. Too high water temperature	4.Check the value of the water temperature sensor, to ensure it works properly.
Too low suction pressure	1.Drier filter blocked	1.Change the drier filter
	2.Expansion valve failure	2.Check and replace the expansion valve.
	3.Lacking of enough refrigerant	3.Inspect the unit for leakage and fix it if any. Discharge all refrigerant and charge the unit again with right amount.

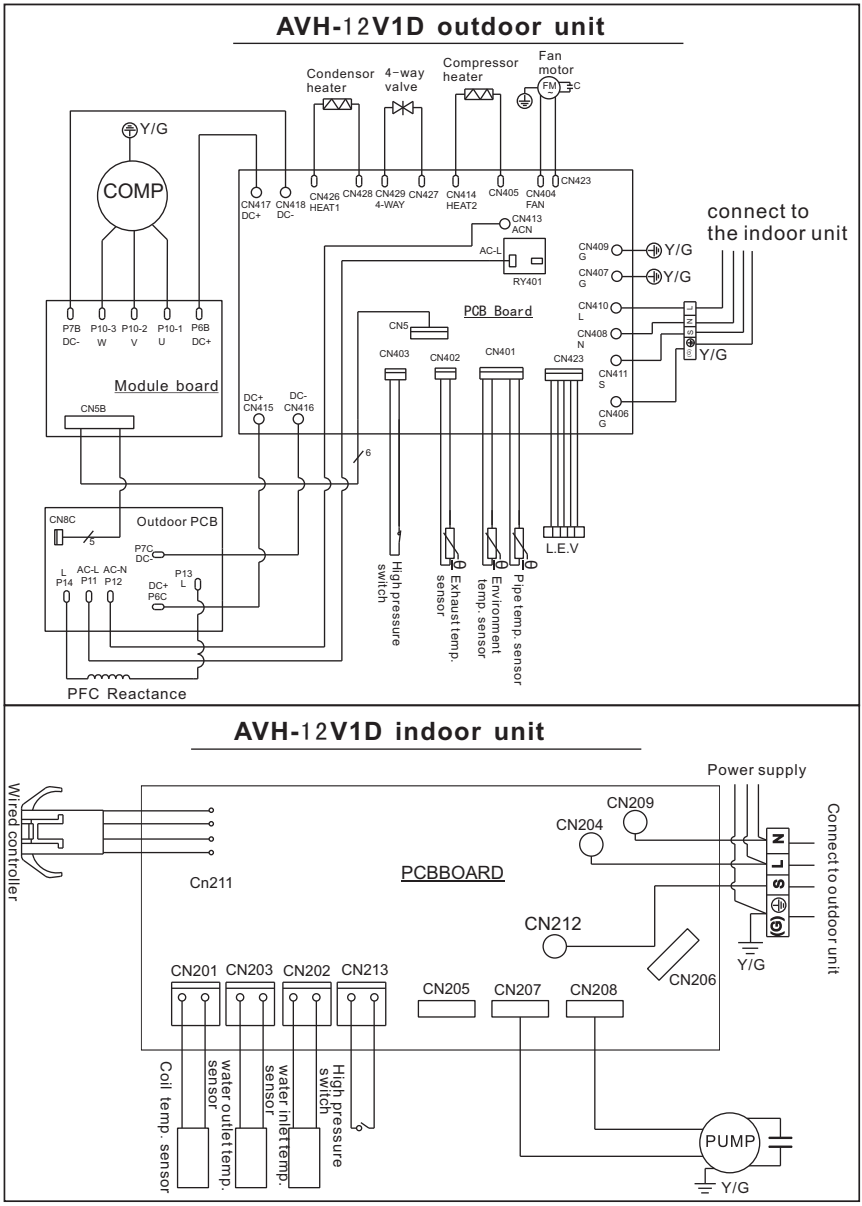
4.3 Trouble shooting

Unit can not defrost properly	1.Coil temperature sensor failure	1.Check the position and value of the coil temperature sensor. Replace it if necessary.
	2.Air inlet/outlet blocked	2.Remove any object that blocks the air circulation of the unit. Clean the evaporator coil occasionally.

The following phenomenon may not be problems. Please contact with a professional maintenance staff.

NO	Malfunction	Possible Causes
1	The unit is not running	1.May be caused by compressor restart protection. The interval time of compressor restart is 3 minutes. 2.Please check whether the circuit breaker, the power supply is open.
2	The unit is too noisy	When the unit is running, if sound of the running water can be heard from the system of the unit, it is the sound of running of the refrigerant. This is not a failure.
3	The unit output is too small	Check whether the air inlet/outlet is blocked. Check whether the temperature setting is too high in cooling mode, or too low in heating mode. Check whether the room is too big. Check whether there are too many people inside the house when unit is in cooling operation.

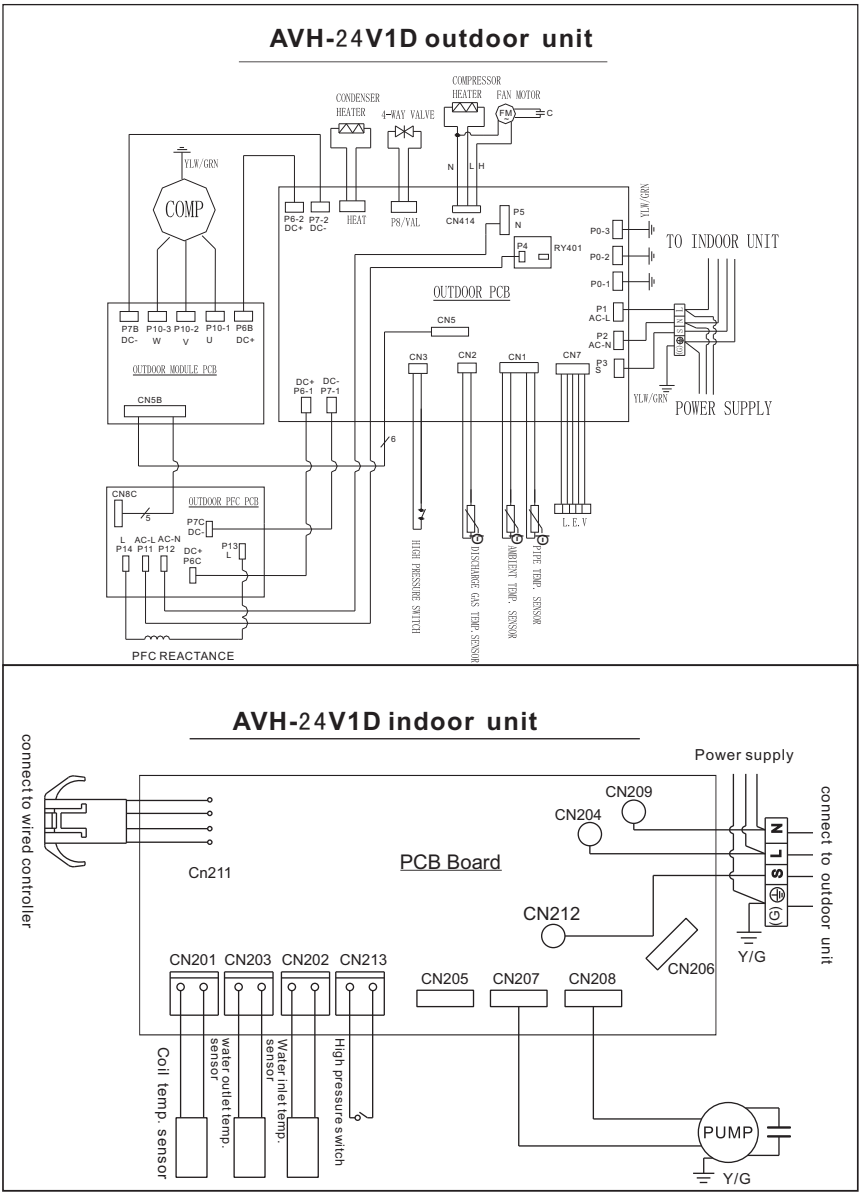
5.1 Wiring diagram



TAKE CARE !

This diagram is correct at the time of publication. Manufacturing changes could lead to modifications. Always refer to the diagram supplied with the product.

1. Wiring diagram



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